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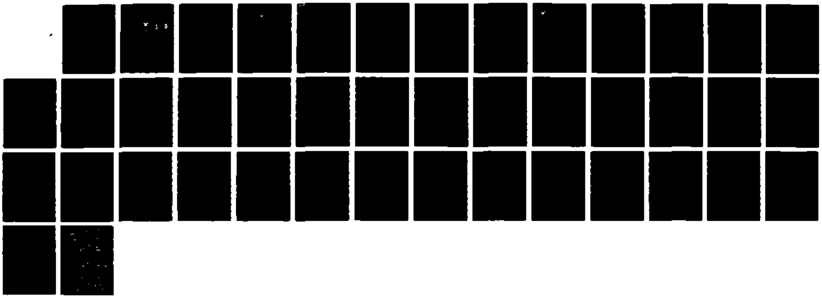

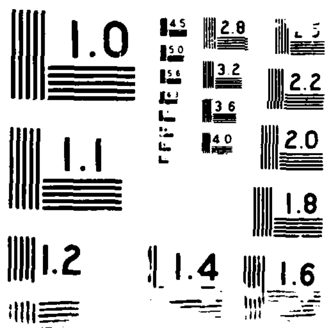
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AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

INTEGRATION OF LANTIRN INTO OPERATIONAL FIGHTER TRAINING

MAJOR ANDREW M. GECELOSKY 88-1015

"insights into tomorrow"

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TITLE INTEGRATION OF LANTIRN INTO OPERATIONAL FIGHTER TRAINING

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The introduction of the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) system on the F-15E and F-16C/D aircraft will result in increased night flying. Quality of life issues and safety concerns have been raised in response to an increase of night training. The study proposes seven tenets that, when applied with effective scheduling, enhance quality of life and flight safety at LANTIRN designated bases. The study concludes that LANTIRN can be successfully integrated into the Tactical Air Forces.

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PREFACE

The Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system provides a technological breakthrough in the night flying arena. Comprised of a navigation and a targeting pod carried underneath the aircraft, LANTIRN significantly changes the tactical fighter approach to night flying. "The system's navigation pod embodies a wide-field-of-view FLIR (forward looking infrared) sensor and a terrain-following radar. Its HUD (head-up display) is the pilot's 'night window' showing him scenes outside of his aircraft as if they were actually visible to him in the adequate light of early evening" (5:53).

Technologically more complex, the targeting pod contains a wide and narrow field of view, a laser designator, and an automatic target tracker (5:53). This pod cues imaging infrared (IIR) Mavericks and terminally guides laser guided bombs (LGBs).

All F-15E aircraft and 300 F-16C/D, Block 40 aircraft will be LANTIRN capable (5:52). In order to realize the full potential of these aircraft and the LANTIRN system, aircrews must be properly trained. As such, increased night training is inevitable and has been a debated topic. Of particular concern are quality of life issues brought about by this anticipated increase of night flying. Quality of life issues include family and social life disturbances, along with interruptions of leisure time. Safety concerns have also been voiced due to the disruption of aircrew biological rhythms through rotation of day and night flying schedules.

This study examines LANTIRN integration into operational fighter training while evaluating quality of life and safety concerns. Only operational units will be included since they represent our night combat capability. Further, the term <u>operational training</u> used throughout this paper will refer only to continuation training: training conducted for proficiency and improvement of mission ready (MR) aircrews. Finally, this study assumes the reader has some knowledge of tactical fighter aviation.

The author would like to thank Lt Col John Perrigo for his superb assistance as project advisor and Lt Cols Dave McLelland and Steve Hanes, HQ TAC/DOOF, for their expert perspectives, time, and effort in conjunction with this study.

ABOUT THE AUTHOR

Major Andy Gecelosky received his commission in December 1974 through Air Force Officer Training School. After completing Undergraduate Navigator Training and F-4 Replacement Training Unit (RTU) he was assigned to the 21TFW, Elmendorf AFB, AK as an F-4 Weapon Systems Officer (WSO). Subsequent assignments included the 8TFW, Kunsan AB, ROK and the 347TFW, Moody AFB, GA. While assigned to the 347TFW, he completed the F-4 Fighter Weapons Instructor Course at Nellis AFB. Major Gecelosky accumulated over 2000 hours of flying time in the F-4 and served as instructor WSO, flight examiner, squadron weapons officer, and flight commander.

In 1985, he was assigned to the Fighter Operations Directorate, HQ Tactical Air Command and also served as Executive Officer, DCS/Operations. He holds a Bachelor of Science Degree in Biology from Gettysburg College and a Master of Arts Degree in Human Resources Management from Golden Gate University. Major Gecelosky is presently assigned to Air University as a course officer in the Air Command and Staff College.

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REPORT NUMBER 88-1015

AUTHOR(S) MAJOR ANDREW M. GECELOSKY, USAF

TITLE INTEGRATION OF LANTIRN INTO OPERATIONAL FIGHTER TRAINING

I. Purpose: To effectively integrate proposed LANTIRN training with quality of life and safety concerns so that effective training can be achieved.

II. Problem: Future TAF (Tactical Air Force) aircraft will have a significant night employment capability with the LANTIRN system. In order to realize the full potential of these aircraft and the LANTIRN system, aircrews must be properly trained. Therefore, increased night training is inevitable and directly affects life-styles currently enjoyed by TAF aircrews, maintenance personnel and Air Force families. An effective night training program must balance quality of life issues with realistic training.

III. Data: Realistic training must be based on anticipated wartime missions. For the LANTIRN-equipped F-15E and F-16C/D, primary air-to-surface missions should be Air Interdiction and Offensive Counter Air (Airfield Attack). Night Close Air Support (CAS) is not recommended because of the difficulty associated with night CAS and current, limited experience with the LANTIRN system. Training must also include day air-to-surface missions as well as air-to-air sorties to take full

advantage of multi-mission capabilities inherent in TAF LANTIRN aircraft. Using the Graduated Combat Capability (GCC) concept, required sorties are established encompassing anticipated combat missions and appears to be a valid starting point for night training. As the LANTIRN database is built through years of system experience, more precise sortie requirements can be achieved. Seven tenets are discussed and, in conjunction with effective scheduling, provide productive training while balancing quality of life and safety issues. Finally, a representative flying schedule and a six month sample training cycle is presented, demonstrating day-to-day operations in a "typical" LANTIRN squadron.

IV. Conclusions: Effective operational training can be achieved in a LANTIRN-equipped squadron while minimizing quality of life and safety issues. More experience with the LANTIRN system will provide future refinements to the training program and schedules presented in this study. Nevertheless, LANTIRN-equipped squadrons can achieve the same quality training prevalent in today's tactical fighter squadrons. Concerns expressed for ineffective night training and/or a greatly altered life-style for aircrews and other base personnel are unfounded.

V. Recommendations: Despite an increase in night flying, multi-mission capabilities of the F-15E and F-16C/D must be fully exploited. Air-to-air, as well as air-to-surface (both day and night) missions, must be incorporated in operational training. Overtasking remains a potential problem but can be overcome by delegating sortie and event requirements to the unit level. By adopting the seven tenets presented in Chapter Three, LANTIRN training can be effectively integrated into operational squadrons safely and with minimal impact to quality of life.

"The lack of a good nightime capability has been a principal reason for the poor success of many interdiction campaigns" (5:ix).

CHAPTER 1

THE CHALLENGE

With the advent of the Low-Altitude Navigation and Targeting for Night (LANTIRN) system, the Tactical Air Forces (TAF) will possess a true night capability. Night flying will take a quantum leap forward leaving behind flares, illuminating "logs" and other dinosaurs of previous eras. Within the TAF all F-15E and selected F-16 C/D wings will be tasked to employ guided and unguided munitions in the night environment using the LANTIRN system for navigation and targeting. The major challenge facing these aircrews is to achieve adequate peacetime training thereby easing the transition to combat. Coupled with the concept of readiness are quality of life issues brought about by an inevitable increase of night flying. Disturbances in family and social life, interruption of leisure time, and safety concerns are some of the factors that must be balanced in an operational training program. This study advocates seven basic tenets and applies them to a sample operational flying schedule. Despite an increase of night flying, the reader will see that effective operational training can be accomplished safely, with minimal impact to quality of life on LANTIRN bases.

With the exception of a few Pave Tack squadrons, night flying has not significantly progressed since World War II. As such, experiences of World War II, Korea, and the "Night Owls" of Vietnam should have little influence on night flying in future conflicts. Because the LANTIRN system is revolutionary rather than evolutionary, future night training should not be based solely on previous night employment concepts. Terms such as "diurnal crossover", "absolute relative humidity," and "infrared predictions" are foreign to most fighter aircrews.

While it is foolish to disregard history completely, recent studies continue to propose LANTIRN training on past methods of night flying. This simply cannot be done. For example, the F-111 is often compared to the F-15E when proposing night air-to-surface training programs (15:--). Although air-to-surface missions are similar, the F-111 must rely strictly on terrain-following radar for low altitude night/adverse weather flying. Even Pave Tack-equipped F-111s do not possess the technology incorporated into the F-15E cockpit for the conduct of night air-to-surface missions. In addition to LANTIRN and numerous cockpit enhancements, the F-15E also maintains an air-to-air capability. These major differences between the two aircraft must be recognized when developing night training programs.

Those who refine future night training will develop a new "database" as a result of experience gained from using the LANTIRN system. For example, a recent inflight test of the LANTIRN targeting and navigation pods, conducted by the Air Force Operational Testing and Evaluation Center (AFOTEC), provided valuable training information concerning inexperienced F-16 pilots (7:--). Until more experience is gained along these lines, such questions as "what percentage of training can be devoted to night flying and how much night flying is necessary to stay proficient using the LANTIRN system ?", remain educated estimates.

As this database is collected, commanders must resist the temptation to overtask LANTIRN squadrons. Overtasking causes a squadron or entire wing to become focused on numbers rather than actual combat effectiveness. Above all, training emphasis must be based on quality instead of quantity. More sorties does not always equate to better sorties or better trained aircrews. Multi-mission capabilities of the F-15E and F-16C/D, combined with "around-the-clock" employment, dictate that training cover a spectrum of missions. This greatly compounds the training development of an operational wing. Nevertheless, dedication to a single mission (i.e., air-to-surface only) or single environment (day or night) greatly reduces the flexibility of multi-mission aircraft.

A sound training program is built around anticipated wartime taskings. For example, the F-15E is tasked for "all weather deep penetration and under the weather/night air-to-surface attack/strike using guided and free-fall weapons," with a secondary mission of "all weather air defense" (12:7-1). Based on its designed operational capability (DOC), the F-16 C/D will be employed in similar roles, but F-16 tasking includes Close Air Support (CAS) and Air Superiority missions.

In terms of Air Force doctrine, primary air-to-surface

missions for LANTIRN-equipped squadrons should be Air Interdiction and Offensive Counter-Air (Airfield Attack). Already characterized by extensive mission planning, these missions will require even more planning to cope with infrared (IR) imaging necessary to navigate along low-level routes and identify targets. Nevertheless, because of the usually known and stationary aspects of the targets, these missions lend themselves more readily to the night environment. In addition to night air-to-surface operations, element/formation proficiency during daylight flying must not be neglected, since future combat may entail daylight missions as well. Therefore, an operational training program must blend both day and night operations into air-to-surface training.

This study does not advocate night close air support (CAS) for either aircraft, even though CAS is defined in the F-16 DOC. Although beyond the scope of this study, night CAS is not recommended due to inherent mission characteristics. It has been the author's experience that extensive coordination between the ground commander and airborne assets, coupled with fleeting targets and the somewhat unpredictable nature of CAS, make this mission difficult during daylight operations. The night environment will only magnify traditional problems experienced in the CAS mission. This should not lead to the conclusion that LANTIRN-equipped aircraft will never perform the CAS mission. However, until more experience is gained with the LANTIRN system, this study recommends that any CAS mission for LANTIRN F-16 squadrons be confined to daytime only.

Finally, the author believes that training in the air-to-air arena must also receive some attention, since the F-15E and F-16 are capable of carrying air-to-air missiles. As stated in their respective DOCs, future combat employment will include Air Defense (F-15E) and Air Superiority (F-16) missions. Although air-to-air training is important, primary emphasis should be directed toward the air-to-surface mission.

In conclusion, past experiences in night flying offer little on which to base future LANTIRN training. Operational training programs for LANTIRN equipped squadrons must exploit the multi-mission capabilities of these aircraft, rather than focusing on one area. In this manner, maximum mission flexibility for each wing and squadron can be maintained. Primary attention should center on the air-to-surface missions of interdiction and offensive counter-air (OCA), with some emphasis in the air-to-air arena. Since future combat may involve both day and night missions, LANTIRN squadrons must be prepared to fight in both the daylight and nighttime environments. Despite the multi-mission capabilities of both aircraft and resultant varied taskings, quality training sorties are preferred over quantity. Chapter Two will now discuss some general aspects of an operational training program in the F-15E and LANTIRN-equipped F-16C/D.

"Night operations have a deserved reputation for difficulty" (2:3).

CHAPTER TWO

OPERATIONAL TRAINING--AN OVERVIEW

Perhaps the most difficult challenge with the LANTIRN system is developing an effective operational training program. Training complications result from multi-mission capabilities of LANTIRN aircraft coupled with increased night flying. Previous studies in this area concentrated on the proper sortie ratio of day-to-night flying, with recommendations ranging from 30% to 100% for night training (15:33). Rather than discussing day-to-night ratios and percentage breakouts, a more useful tool is the Graduated Combat Capability (GCC) concept explained in Multi Command Manual (MCM) 51-50. Applying sorties in this way provides a spectrum between a minimum amount of training (Level A), training which is desired or standard (Level B), and training which is ideal (Level C).

In discussing an operational training program for night units, it is important to point out a major dichotomy between the F-15E and the F-16C/D. Initial LANTIRN training for F-15E aircrews will occur in the Replacement Training Unit (RTU) at Luke AFB. However, F-16 pilots will be temporarily assigned to Luke AFB for LANTIRN upgrade training after attaining proficiency during "day low altitude navigation at 500' AGL in the F-16C/D Block 40 aircraft" (14:4). Thus a typical F-16 LANTIRN squadron will have a mix of pilots; some LANTIRN qualified and others awaiting training at Luke AFB.

In contrast, the F-15E squadron will have all mission ready (MR) aircrews qualified in LANTIRN. This difference is further detailed in the current GCC proposals outlined in the LANTIRN Concept of Training (COT) and the F-15E COT. Mission Qualification Training (MQT), required by RTU graduates when initially assigned to an operational wing, is not included. The F-15E GCC program is outlined on the succeeding page.

SORTIES (Inexp/Exp):	Level A	Level B	Level C
Air-to-Surface (Day)	24/21	( )	( )
Air-to-Surface (Night)	15/12	( )	( )
GCC Other Night	1/1	( )	( )
Air-to-Air	8/8	( )	( )
Total GCC Sorties	48/42	62/54	80/70

For comparison purposes, the F-16 GCC program is outlined in the LANTIRN COT and is as follows:

SORTIES (Inexp/Exp)	Level A	Level B	Level C
Air-to-Surface	36/29	( )	( )
LANTIRN (Air-Surface, Night)	----	21/16	( )
Air-to-Air	16/13	( )	( )
Total GCC Sorties	52/42	69/54	92/74

As the reader can see, LANTIRN is considered a B-level sortie in the F-16, while an A-level sortie for the F-15E. Headquarters directed B-level sorties apply only to the F-16 LANTIRN sorties. Parentheses in the remaining "B" and "C" level columns indicate sorties at the discretion of the commander, with total GCC sorties stipulated by the MAJCOM. In this way the commander will determine the sortie mix for not only day-to-night sorties, but also air-to-surface and air-to-air sorties. This requires squadrons to formalize their intended sortie mix for B and C levels and work toward that end. The system also allows individual squadrons to vary sortie ratios, thus providing flexibility in training based on differing anticipated wartime tasking. The author fully concurs with this sortie breakout. Further refinements can be made as the LANTIRN database matures.

The differences in total sorties between the F-16 and the F-15E are the result of mission tasking. As was mentioned in Chapter One, the F-16 has more varied tasking and thus requires more training sorties. For example, air-to-air sorties for inexperienced F-16 pilots are twice those required of F-15E aircrews at level A (16 and 8, respectively). In the air-to-surface role, current F-16 plans call for 15 Maverick qualified pilots, and at least 10 pilots per squadron qualified in the LANTIRN targeting pod (14:A-3). Since a typical F-16 squadron will have a mix of both LANTIRN and non-LANTIRN qualified pilots, the LANTIRN pilots may be forced into flying more night sorties per training cycle than an F-15E aircrew. Because of the F-16 single-seat cockpit, additional night sorties are viewed in a positive light but their uneven distribution can reduce squadron scheduling flexibility. Due to more varied tasking, the F-16

LANTIRN squadron presents a greater challenge in developing operational training.

In contrast, the F-15E sorties are primarily oriented toward air-to-surface missions. Because of the two-seat cockpit configuration, use of the targeting pod is more easily managed in the F-15E (7:5). In addition to typical laser guided bombs (LGBs), the only specialized weapons currently designated for F-15E aircrews are the GBU-15 and IR Maverick (12:7-2). Thus it appears the F-16 LANTIRN squadron will be more susceptible to overtasking than the F-15E, but does not exclude the F-15E from the same fate in the future. Even though more control over requirements is delegated to the wing, overtasking remains a serious threat to operational training.

Coupled with GCC training sorties are GCC events. Events are tasks performed during a mission such as weapons deliveries, air-to-air refueling, low-level flying, etc. An in-depth discussion of events is not within the scope of this study, however, a few points are germane. Weapons delivery events for LANTIRN squadrons should be treated as generic rather than delineating between day and night. In this manner, all record delivery bomb scores count toward weapon qualification thus providing a true measure of employment capability. The author believes that LANTIRN can reduce the stigma associated with night bombing and, in the long run, may downplay aircrew preference for daylight bombing. Finally, combining day and night bomb scores eliminates cumbersome tracking of required day/night percentages for each bombing event.

The sorties outlined previously can accomplish all required events for both the F-15E and F-16, as designated in their respective COTs. Normally, aircrews can complete required sorties for a particular training cycle, however, events are usually more difficult to attain due to the uniqueness of some taskings. As a result, events are viewed as "squares" to be filled and many times function as negative training enhancements. To alleviate this situation, higher headquarters events should be kept to a minimum, allowing each LANTIRN wing or squadron to determine much of their own tasking. The wing/ squadron derived taskings should be forwarded to the appropriate headquarters, reviewed, and then published as formal GCC events for that training cycle, similar to B and C level sorties.

This chapter presented GCC sortie requirements for the F-15E and the F-16 LANTIRN squadrons. GCC events have not been discussed in detail because they should be left primarily to the individual wings or squadrons with a minimum of higher headquarters taskings. Allowing B and C level sorties and especially events to be managed at the squadron or wing level can greatly reduce overtasking of LANTIRN squadrons.

"Potential enemies will be equipped and prepared to fight at night. Thus TACAIR must have the versatility, adaptability, and capability for night employment" (10:1).

Chapter Three

THE SEVEN TENETS: A FRAMEWORK FOR NIGHT TRAINING

This chapter proposes seven tenets which can be applied to LANTIRN and night training in general. These tenets provide the foundation necessary for effective operational training while balancing quality of life issues. Where necessary, a distinction between the F-15E and the F-16C/D is made.

1. Night flying should occur year-round.

Justification: Despite reduced periods of darkness during the summer months, night flying must occur consistently throughout each training cycle to maintain night proficiency. "Repeated studies indicate that the greatest rate of skill erosion or 'forgetting' occurs ... after practice or training ceases" (13:21). Therefore, every effort should be made to continue night flying, even during the summer months when a greater amount of daylight, combined with Daylight Savings Time, necessitates late evening takeoffs. However, summer flying will be characterized by a reduced rate of night flying. Reduced summer night sorties preclude night flying well into early morning hours and is discussed further in tenet number five.

Since the GCC training cycles are neatly divided between 30 June and 1 July, more night sorties can be flown early in the half for the January through June cycle. Conversely, night flying would be concentrated in the latter half of the second training cycle (1 Jul to 31 Dec). An effective simulator program can help bridge the gap during the summer months. Although simulators can never replace the experience gained from actual flying, these trainers can significantly enhance airborne operations.

At operational wings F-15E aircrews will use a Weapon System Trainer (WST).

> The WST will replicate both of the F-15E cockpits and provide a comprehensive flight, mission, and tactics environment....The Terrain Following Radar (TFR), Imaging Infrared (IIR), Synthetic Aperture Radar (SAR), Electronic Warfare (EW), and visual data base/image generation systems will correlate for realistic mission simulation. WSTs will provide practice in all aspects of the F-15E combat mission under normal or degraded systems operation, adverse weather conditions, and EW threats (12:9).

For F-16 pilots, the LANTIRN Mission Trainer (added to existing simulators) will also be capable of multi-mission training. "It will possess the capability of projecting Forward Looking Infrared (FLIR) video on the HUD and appropriate aircraft sensor displays. It will provide practice of the mission under normal and degraded system operations and simulated electronic threats" (14:5).

This study, although advocating year-round night flying, realizes the amount of night flying during any given month will change throughout the year. Year-round night flying does not entail flying every night, and there will be times when night flying is impractical or simply not feasible. Simulator effectiveness is a major determinant of reduced summer night flying. Use of the simulator will help retain LANTIRN related skills in conjunction with limited night flying during the summer months. However, if the simulator is found to be ineffective, additional summer night flying will have to be instituted. To those readers who would argue that simulators can reduce night flying year-round, the reader is reminded of the earlier statement that simulators can never replace the experience gained from actual flying.

Therefore, selected simulator use during summer months to compensate for reduced night/LANTIRN sorties is acceptable, but the line must be drawn at some point. Although LANTIRN/night proficiency will decline somewhat during the summer months, it is not expected to seriously impact readiness in the night arena. During this period, increased skill levels can be realized in daylight air-to-surface and air-to-air missions.

2. Schedule two flying periods per day.

<u>Justification</u>: The main advantage of two flying periods per day is a reduced workday for the aircrews and maintenance personnel. Two flying periods per day is commonly referred to as

a "two-go" day and is fairly prevalent throughout the Tactical Air Command today. The study recommends a two-go schedule of 14 turn 12. In general, the wing flying schedule would be shifted from the current morning and afternoon flying periods to an afternoon and evening flying period. The first-go (14 sorties) would be flown in the afternoon, with the second-go (12 sorties) flown in the evening. During the summer months, only the later second-go sorties would be night sorties. All second-go sorties during the rest of the year would normally be flown at night. However, the second-go can be adjusted to allow more or less night sorties on any given day.

As a corollary to this tenet, two-go days require sortie surges. Surges are normally conducted once a month, to meet the required training, sorties and flying hour allocation established for that training cycle. A sortie surge consists of increased flying over a period of two to four days and provides increased training for operations and maintenance. A typical surge day can double the amount of sorties flown on a normal two-go schedule.

LANTIRN squadrons (both F-15E and F-16) will normally have 24 primary aircraft assigned (PAA) to the respective maintenance squadron. However, some of these aircraft will not be available to operations due to programmed depot maintenance (PDM), use as local maintenance trainer, phase inspections, and aircraft that are not mission capable (MC) for one reason or another. Because of these factors, it is impossible to schedule 24 aircraft on a daily basis. The 14 lines scheduled in the first go would normally require 16 MC aircraft to cover ground aborts. With flying periods scheduled for afternoon and evening timeframes, morning hours can be devoted to preparing aircraft for the scheduled flying that day. Considering improved mean time between failures on the aircraft and associated systems, a 14 turn 12 schedule should be consistently feasible from a maintenance standpoint. This two-go schedule (14 turn 12) is flown by numerous F-16 squadrons today and produces 26 sorties per day, assuming no ground aborts.

In summary, two flying periods per day requires monthly sortie surges and has the added advantage of a reduced aircrew workday. A typical squadron would split into a day and evening/night shift rotating at the discretion of the commander. It is recommended the schedule be rotated for a one or two week period. In this fashion, individual aircrews can maintain night proficiency while keeping family and social life disturbances to a minimum.

3. Schedule night flying Monday through Thursday.

Justification: This concept has been suggested previously (15:22) and is required from both a maintenance and aircrew standpoint. Friday night flying requires aircraft maintenance well into Saturday, further exacerbating quality of life issues for maintenance personnel. In addition, some aircrews flying on a Friday night while their peers attend the Officer's Club "Happy Hour" or similar Friday night activities, may not concentrate fully on the task at hand. Therefore, from a safety standpoint, Friday night flying should be avoided whenever possible. However, a wing/squadron may be forced to schedule sorties on Friday night if weather precludes some flying earlier in the week. This would depend on many factors including flying hours and required training to be completed prior to the end of the half.

Based on the 26 scheduled sorties per day discussed in the previous tenet, it is estimated that an average of twelve sorties are required on Friday to complete required training for the half. Friday can also be reserved for necessary aircrew ground training and other squadron or wing meetings. A typical Friday consists of twelve morning sorties followed by necessary ground training in the afternoon.

4. Night sorties are defined as those which takeoff after civil twilight.

Justification: Training sorties must be flown in the actual environment intended for combat. Therefore, a night sortie can only be credited if the aircraft can takeoff after civil twilight. This idea is easier than it might seem at first. For example, at Seymour Johnson AFB, NC, civil twilight ends at approximately 2045L throughout the month of July (3:--). With the first takeoff at 2045, it is possible for a squadron to fly 12 night sorties prior to midnight. With two night ranges available, a three squadron wing can fly 36 range sorties between 2045 and 2400 allowing 20 minutes of rangetime for each flight. By November, civil twilight ends at 1720L on average, thus allowing even more night flying or completion of the second-go at an earlier time.

A study by Major Wayne Mudge points out a flaw in logging night sorties under current regulations.

> To illustrate, let us examine one concept from current training manuals. TACM 51-50, Aircrew Training, defines a night sortie as 'one on which either takeoff or landing and at least 60% of flight duration or one hour flighttime, whichever is less, occur during official hours of

> darkness.' The official hours of darkness, according to AFR 60-16, Flight Rules, occur between 'official sunset and official sunrise.' Using current definitions, then, a fighter crew could conceivably takeoff 20 minutes before sunset, fly to a tanker for refueling, land an hour after takeoff, and log a night sortie with a night refueling. Legal? Yes, but certainly not realistic. Most of the sortie, including the refueling was flown in daylight or near daylight conditions. The aircrew in this example legally updated their night currency, but their proficiency and capability to fly and fight in the dark were not improved at all (16:7-8).

Certainly this example is characteristic of current TAF night training, but are the regulations at fault or the commanders who allow such "night" training to occur?

A quality night sortie is one flown in its entirety after civil twilight. As a corollary to this tenet, any required events performed after civil twilight should be credited toward completion of night events. For example, a sortie that departed at 2030 (civil twilight=2045) and later refueled at 2100 would receive credit for a night air-to-air refueling even though the sortie is credited as a day sortie (takeoff prior to 2045) . This same principle applies to those sorties flown in proximity of sunrise. During Daylight Savings Time, night sorties (as defined here) will be more difficult to attain. However, even though night sorties are reduced during the summer months, night flying can still be accomplished thus maintaining LANTIRN/night proficiency.

5. The last landing should occur no later than 2400.

Justification: Adhering to this tenet will greatly improve quality of life and flight safety with little adverse effect on night training. One of the safety concerns with night flying is the stress imposed by upsetting the body's circadian rhythms and the resulting performance degradation. Information gathered from studies conducted on airline pilots flying long trans-meridian flights can have limited application to a night flying schedule, since both situations deal with time. The studies found that "if the difference in clock time does not exceed five hours, biological rhythms are not altered. If it does exceed five hours, it will take about a week for the biological rhythms to become adjusted to the place of arrival (1:16)."

Based on these studies, shifting a wing flying schedule five

hours should not significantly alter aircrew circadian rhythms. This five hour shift can be attained by restricting the last landing to 2400. The 2400 hour landing limit pertains more to daylight savings time and summer night flying. During Standard Time, the night flying schedule can easily be completed prior to 2400. By minimizing interruptions to daily sleep cycles, aircrews can better adjust to rotation of day flying and family and social activities. Using 2400 as the last landing time of the second flying period prevents continuous adjustments to aircrew biological or circadian rhythms. This in turn leads to a tendency for better performance and ultimately increased safety.

An added benefit to this tenet is reduced noise complaints. It is difficult to estimate increases of noise complaints with an increase of night flying. Nevertheless, an anticipated increase of complaints can be expected. Therefore, common sense dictates that fewer noise complaints would be registered if all night flying were completed by 2400, as compared to flying beyond midnight. In addition to the reduced "noise complaint" concept, this tenet can improve safety and quality of life without adversely affecting night training requirements.

6. Night Flying dictates a reduced aircraft utilization (UTE) rate

<u>Justification</u>: UTE rate refers to the number of times one aircraft in a squadron is expected to fly during a month. Thus a 24 PAA squadron flying an 18.0 UTE rate would produce 432 sorties per month.

24 PAA Aircraft X 18 Sorties/Aircraft/Month = 432 Sorties/Month

Because night flying Monday through Thursday eliminates a full day of flying on Friday, a corresponding UTE rate decrease is inevitable. Despite the fact that sortie surges can be expected to make up the difference of those sorties lost to only one "go" on Friday, quality sorties are preferred rather than quantity. As discussed in Chapter One, more sorties does not necessarily equate to better sorties or better trained aircrews.

Increased mission planning time also dictates a reduced UTE rate so that LANTIRN sorties can be adequately planned. In addition, the F-15E average sortie duration (ASD) of 1.7 hours still provides a significant number of allocated flying hours. A further reason to reduce the UTE rate stems from aircrew experience. Initially, the majority of F-15E aircrews will be experienced (in terms of fighter time) and will require fewer sorties to meet GCC level tasking. Higher experience levels in the F-16 also dictates fewer GCC sorties required during a training cycle.

Currently, the F-16 UTE rate is 22.0 and the projected F-15E UTE rate is 20.0 (12:7-1). In light of the above discussion, the author recommends a 20.0 UTE rate for the F-16 LANTIRN squadrons and an 18.0 UTE rate for the F-15E. Even with this reduced UTE rate, all GCC sorties listed in the previous chapter can be accomplished.

7. Do not allow Vision Restricting Device (VRD) flights as a substitute for night sorties.

Justification: A daytime Vision Restricting Device (VRD) has been proposed in lieu of some night flying. The present concept uses a polarized canopy and helmet visor to restrict daytime cues. Currently an amber visor in conjunction with a blue tinted canopy will simulate the night environment while still allowing the FLIR imaging to be seen through the HUD (14:6). While this idea may appear to be the panacea for reduced night flying, a closer examination reveals the VRD as a detriment to LANTIRN training.

LANTIRN imaging is dependent on heat absorbed during solar heating or heat generated from the object itself, for example, internal combustion engines. An object which derives its heat strictly from solar energy is referred to as a passive emitter. Most air interdiction and OCA targets (supply areas, bridges, runways, etc) are passive emitters. For passive emitters, the cycle whereby an object heats (during daylight) and cools (after sunset) is referred to as the diurnal cycle (6:--). It is this cycle that changes the IR imaging displayed in the HUD.

> The impact of the diurnal cycle is critical for mission planning, especially against such targets as bridges or concrete bunkers which have no internally generated heating...Against a target that derives all its IR emissivity from the sun, mission planning is critical because:
>
> (1) The target will appear dark at certain times of the day and light at others.
>
> (2) During the morning and evening "crossovers" the target may be undistinguishable from its background in IR imagery (6:41-42 as cited in 11:8).

The diurnal crossover occurs when the object and its background exhibit the same temperature. This phenomenon is one reason why LANTIRN missions require more planning.

Flying with a VRD during daylight hours differs from the IR imaging experienced on the same route at night. "IR displays seen in daytime training may be sufficiently different from those seen in nighttime training to seriously degrade the value of daytime training" (11:9). Since the LANTIRN system will primarily be used at night during combat, use of a peacetime VRD will result in negative training.

Finally, a night sortie encompasses more than just the flying portion. Preflight, taxi, arming, de-arming, and postflight in the dark are all elements of a total night sortie. These aspects must also be practiced by maintenance and support personnel. Using a VRD degrades this aspect of night sorties; aspects that could potentially ruin an otherwise valuable night sortie when performed under combat. The author does concede the use of VRDs at Luke AFB for "schoolhouse training" due to programmed flying training and other aspects of formal training which do not allow flexibility in flight scheduling. However, VRDs must be eliminated at operational wings.

This chapter outlined seven tenets which provide a framework for LANTIRN/night training. They are repeated here as a summary.

1. Night flying should occur year-round.
2. Schedule two flying periods per day.
3. Schedule night flying Monday through Thursday.
4. Night sorties are defined as those flown after civil twilight.
5. The last landing should occur no later than 2400 hours.
6. Night flying dictates a reduced UTE rate.
7. Do not allow VRDs as a substitute for night sorties.

Their application to daily flying operations will produce quality sorties, subsequently leading to effective training while balancing quality of life issues and safety concerns.

"The principle objective of night flying and night employment training is to prepare aircrews to conduct effective tactical air operations at night" (10:1).

CHAPTER FOUR

DAY TO DAY OPERATIONS

This chapter discusses day-to-day operations in a typical LANTIRN squadron. As an example, the author has selected a 24 PAA F-15E squadron located at Seymour Johnson AFB, NC. (This will be the first operational wing to use the LANTIRN system). At the present time, 22 low-level routes have been identified as possible training routes (17:--). Despite the fact that some routes are restricted from use during darkness, the vast majority of these routes can be used for night and terrain-following operations.

Currently, three bombing ranges will also be available and include Dare County, Poinsett, and R-5306. Of these three ranges Dare County can best support LANTIRN operations. Poinsett is too small but nevertheless usable for two-ship operations and R-5306, managed by the Marines, requires coordination for extended use at night. In addition, the Southeast Range Initiative may provide another range (17:--). This program, currently in its early stages, promises to establish a range complex somewhere in the southeast US, similar to Avon Park Range in central Florida. This project would greatly enhance all tactical fighter training.

As other wings are designated for LANTIRN operations, a similar process of identifying low-level routes and compatible ranges will occur so that training airspace is sufficient. In this way, LANTIRN units can potentially receive training equivalent to that currently experienced in daylight tactical squadrons. Overseas location of LANTIRN units may not be afforded the same airspace luxury. Host nation agreements must be carefully negotiated to insure adequate training at night. If

necessary, LANTIRN wings may be forced to remain in the United States in lieu of "theater basing" due to night airspace limitations and the resultant deficient training.

In addition to adequate airspace, day-to-day operations require a 6-month training plan to forecast flying hours, training events, and sorties. Flying an 18 UTE rate results in 2592 sorties per training cycle:

24 PAA aircraft x 18 sorties/aircraft x 6 mos = 2592 sorties

Figuring a 15% sortie attrition due to weather and maintenance, a total of 2981 sorties must be scheduled:

2592 sorties X .15 = 389 + 2592 = 2981 scheduled sorties

A 6-month plan is normally revised monthly, based on remaining training requirements, sorties and flying hours.

Another planning factor is the number of flying hours allocated to the wing by Tactical Air Command (TAC). Using a fiscal year cycle, flying hours are computed using a number of factors beyond the scope of this study. For this study, however, it is assumed that the average sortie duration (1.7 hours for the F-15E) times the number of UTE rate sorties (2592) will be allocated by TAC for each training cycle. Further, each sortie is artificially presumed to fly 1.7 hours, thus sorties and flying hours can be treated as a single factor.

Based on the 2981 sorties previously computed, a six month training plan is presented at the Appendix. It outlines the training cycle from July to December, 1988. The seven tenets presented in the previous chapter have been applied to this sample training cycle. By reviewing the Appendix, the reader can see the distribution of sorties over a 6-month period.

In order to apply the tenets further, it is necessary to review a representative flying schedule. A sample 14 turn 12 schedule during the month of July is presented below:

First Flying Period				Second Flying Period		
			# of Aircraft			
BRIEF	TAKEOFF	LAND	1st Go/2nd Go	BRIEF	TAKEOFF	LAND
1400	1600	1745	4-Ship/2-Ship	1745	1945	2130
1420	1620	1805	2- " /4- "	1810	2010	2155
1440	1640	1825	4- " /2- "	1745	2045	2230
1500	1700	1845	2- " /4- "	1800	2100	2245
1520	1720	1905	2- " /-----			
		TOTAL	14 /12 Sorties			

The reader should note that the 1945 and 2010 takeoffs in the second flying period will not be credited as night sorties, even though they will encounter some night flying and actually land after dark. As was discussed earlier, events accomplished after civil twilight would be credited as a night event. Ironically in this case, the pilot could update his night landing currency even though logging a day sortie. Depending on the amount of daylight, these earlier flights would not use the LANTIRN IR imaging but rather visual techniques and the LANTIRN terrain following radar for low-level flying. Rangework would be a combination of both visual and radar deliveries, again depending on the amount of daylight available. If IR imaging is planned for either rangework or low-level navigation, appropriate time must be added to the mission preparation.

The reader should also note that the 2045 and 2100 takeoffs require a briefing 3 hours prior to takeoff to allow sufficient time for LANTIRN IR predictions and other mission planning factors. The commander can adjust the schedule as necessary to accommodate more or less night flying as needed. The amount of night flying during summer months can be varied depending on commander assessment of aircrew LANTIRN/night proficiency. Since civil twilight ends at approximately 2045L throughout the month of July, takeoffs can be as late as 2210 and still land prior to 2400 (assuming an ASD of 1.7 hours).

In contrast to July, a sample November schedule is also presented:

First Flying Period			# of Aircraft	Second Flying Period		
BRIEF	TAKEOFF	LAND	1st Go/2nd Go	BRIEF	TAKEOFF	LAND
1130	1330	1515	4-Ship/2-Ship	1420	1720	1905
1150	1350	1535	2- " /4- "	1440	1740	1925
1210	1410	1555	4- " /2- "	1500	1800	1945
1230	1430	1615	2- " /4- "	1520	1820	2005
1250	1450	1635	2- " / ----			
		TOTAL	14 /12 Sorties			

The biggest difference between July and November is completion of the flying schedule roughly three hours earlier. This is the result of a return to standard time along with fewer daylight hours. In November, civil twilight ends at approximately 1720L, therefore, night flying for the second-go can begin earlier. If additional night sorties are required, the author suggests an "inverted" schedule of 12 turn 14. A discussion of pros and cons to this type of schedule and is beyond the scope of this study.

The daily flying schedule should be divided among the squadron flights so that sorties can be flown by members of the same flight within a particular timeframe. Normally, a typical fighter squadron consists of four flights with each flight commander responsible for the distribution of allotted sorties within his flight.

In relation to a weekly schedule presented below, "A" and "B" flights would man the first flying period, while "C" and "D" flights man the second flying period. Within the second period, "D" flight would have priority for night sorties on that particular week. "C" flight would assume a "transition" status and fill-in those sorties that "D" flight is unable to man, plus any vacancies from the first flying period. A sample schedule with flight breakouts is presented here:

First Flying Period			Second Flying Period	
FLIGHT	TAKEOFF	# of Aircraft 1st Go/2nd Go	FLIGHT	TAKEOFF
A	1600	4-Ship/2-Ship	C	1945
A	1620	2-Ship/4-Ship	C/D	2010
B	1640	4-Ship/2-Ship	D	2030
B	1700	2-Ship/4-Ship	D	2050
C	1720	2-Ship		

Using one week intervals, "C" flight would shift into night sorties the following week, while "D" flight moves to the earlier sorties of the first flying period. The other flights would move accordingly with regard to the flight schedule.

A typical day for a member of "D" flight scheduled to fly in the 2050 takeoff is outlined below:

1330: Arrive at squadron
1400: Simulator (if scheduled)
1600: Return to squadron--Free time for study or additional duty.
1750: Brief for Flight
2050: Takeoff
2235: Land
2300: Debrief
2400: Depart squadron

The reader should note that, if necessary, this individual could be scheduled to fly in the first flying period of the following day (i.e., the 1600 Takeoff with a 1400 Brief). By keeping the first takeoffs of each flying period within four hours of each other, the squadron maintains the flexibility to shift

individuals between flying periods without adversely affecting biological or circadian rhythms. Although this practice is not desirable, a particular flight may not possess the same number of people or specific qualifications (e.g. flight lead, instructor-qualified, weapon-specific qualified, etc), thus forcing exceptions to the scheduling process. While the flight commander must work toward resolving these differences, it is recognized that certain inequities will always exist.

It is recommended that one week intervals be used year-round for scheduling purposes. In this manner aircrews (in particular flight commanders) will be able to predict flight scheduling and completion of training requirements in conjunction with leave and other periods of time away from the squadron.

The concept of rotating flights within a squadron, rather than entire squadrons through a night training cycle, is preferred so that all flying can be completed prior to 2400L. If only one squadron was designated to fly nights for a one week period the daily flying schedule would extend beyond 2400 hours to accommodate both flying periods. This would be particularly true during the summer months. As was discussed in tenet five, flying beyond 2400 hours would upset aircrew biological/circadian rhythms and also impact on quality of life. The author believes that much turmoil can be reduced by distributing night flying among all three squadrons on a daily basis rather than designating a night squadron fot a specified period of time. Finally, maintaining one squadron in complete night training has the tendency to isolate that squadron and result in a disjointed wing.

This chapter, in conjunction with the Appendix, has demonstrated that incorporating LANTIRN operational training into night flying is possible without significantly impacting quality of life and safety issues. As experience is gained at the operational level, refinements can be made to further enhance training and quality of life.

"An interdiction planner who assumes that the enemy will opt for daylight travel must accept a heavy burden of proof or risk serious miscalculation" (5:22).

CHAPTER 5

SUMMARY AND CONCLUSIONS

The F-15E and F-16C/D LANTIRN squadrons will possess the best night employment capability in the TAF. Multi-mission roles of these aircraft, combined with a viable 24-hour employment capability, greatly compound operational training. Nevertheless, a focus of training in one specialized arena significantly reduces the flexibility of LANTIRN aircraft. This study demonstrated how integration of LANTIRN into operational training can be achieved safely and without adversely affecting quality of life.

The GCC proposals presented in Chapter Two represent an initial assessment of sorties required for air-to-surface (day and night) and air-to-air training. Although percentages and ratios can be derived for various comparisons, combat capability cannot be measured statistically. By delegating sortie and event requirements at the "B" and "C" level to the wing/squadron, local commanders can tailor operational training toward anticipated taskings and better assess combat capability. Until a LANTIRN database is established, an underlying question still remains: how much night flying is necessary to achieve continued proficiency in the LANTIRN system? Nevertheless, the GCC proposals discussed earlier provide an excellent starting point without overtasking a unit. Regardless of the final sortie mix, quality sorties remain the keystone of effective training.

The seven tenets discussed in Chapter Three provide this quality, while balancing quality of life issues and safety concerns. These tenets included:

1. Night flying should occur year-round.

2. Schedule two flying periods per day.
3. Schedule night flying Monday through Thursday
4. Night sorties are defined as those flown after civil twilight.
5. The last landing should occur no later than 2400 hours.
6. Night flying dictates a reduced aircraft UTE rate.
7. Do not allow VRDs as a substitute for night sorties.

The day-to-day squadron operations described in Chapter Four demonstrates the application of these tenets while minimizing turmoil associated with increased night flying. Further, the Appendix provides a viable 6-month sortie plan which accomplishes all training dictated by the semi-annual GCC sorties listed in Chapter Two.

Based on day-to-day operations described, the author sees little need to restructure air base operating hours as a result of increased night flying. A recent study advocated the establishment of a "Night Support Office" (11:75). The Night Support Office (NSO) consists of various base agencies such as the Military Personnel Office, Finance, Legal, and Education Offices all located in the same building or in close proximity to one another. The NSO would be manned 24 hours a day with limited staff for the convenience of personnel assigned to a LANTIRN base. As this study has demonstrated, the NSO is not required since all personnel would have adequate time to complete transactions with these base agencies under current operating hours.

Perhaps the most significant area affected by increased night flying is education opportunities. Since the second flying period is conducted in the evening timeframe, evening class formats offered by many universities would conflict with those individuals seeking additional education but having jobs that directly support the flying mission. Although many alternatives are possible, each LANTIRN base will solve this problem individually. However, this area does not affect the base operating hours and LANTIRN bases should not have to restructure their hours of operation because of increased night flying.

Using the concepts and ideas put forth in this study, LANTIRN squadrons of the future will be provided the same quality training afforded present day TAF fighter squadrons. Despite increased night flying, LANTIRN training can be effectively integrated into operational squadrons safely and with minimal impact to quality of life.

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APPENDIX

This appendix contains a 6-month GCC training plan totaling 2981 sorties for the July to December, 1988 cycle. Each month is presented in calendar format demonstrating a two flying period, 18 UTE rate schedule discussed in Chapter Four.

Since this study is primarily concerned with night training, scheduled night sorties required by GCC proposals in Chapter Two is computed. Assuming a crew ratio of 1.25 for the F-15E, 30 aircrews can be expected to man a typical squadron:

1.25 X 24 PAA Squadron = 30 Aircrews

Night sorties at "A" level consist of 16 or 13 sorties depending on aircrew experience. Although "B" level sorties are determined by the unit, a reasonable addition of five sorties for both experienced and inexperienced aircrews can be anticipated. Therefore, "B" level night sorties increase to 21 and 18 for inexperienced and experienced aircrews respectively.

Since initial LANTIRN squadrons will possess a larger number of experienced aircrews than normal, a 50:50 experience mix is assumed. Other personnel include the squadron commander, operations officer and wing staff individuals. Armed with these assumptions, the number of night sorties for a 6-month training cycle can be computed as follows:

Inexperienced Aircrews:	
15 X 21 (GCC Night Sorties/Level B)	= 315 Sorties
Experienced Aircrews:	
15 X 18 (GCC Night Sorties/Level B)	= 270 Sorties
Mission Ready (MR) Staff:	
3 X 18 (GCC Night Sorties/Level B)	= 54 Sorties
Mission Support (MS) Staff:	
4 X 16 (Sorties are estimated, MS requires 30 Sorties/Half)	= 64 Sorties
	699 Sorties

When scheduling, an additional 105 sorties must be added for attrition purposes (assume 15%) bringing the grand total to 804 scheduled night sorties. As an example, if 12 sorties are scheduled each night it would take 67 days (roughly half the number of days in a training cycle) for an entire squadron to achieve "B" level in the night sortie category.

AMPLIFYING NOTES

1. No exercises are depicted but could be scheduled during any of the monthly sortie surges.

2. Sortie surges are normally three days in length and consist of an average of 50 scheduled sorties per day. The daily schedule would be flown as a four-go day.

3. No night sorties are scheduled on the day prior to a surge. This allows maintenance time to prepare the aircraft.

4. All Friday sorties are day only; if necessary Friday night sorties can be flown.

5. UTE Down Days are programmed for each month but can be used for additional sorties if necessary.

6. No deployments or cross-country flights are depicted but could be programmed. Sorties flown on deployments equate roughly to the amount flown at home station. Cross-country flights could be added during weekends to fly additional sorties and hours.

7. Holidays are depicted as No Fly days.

SORTIES SCHEDULED (MONTH) : 510

SORTIES REMAINING (HALF) : 2474

MONTH: July, 1988

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 SCHEDULED SORTIES: 12 DAY SORTIES	2 SORTIE TOTALS WEEK 12 MONTH 12
3	4 HOLIDAY NO FLY	5 SCHEDULED SORTIES: 26----- 14 Turn 12-----	6 -----	7 -----	8 SCHEDULED SORTIES: 12 DAY SORTIES	9 SORTIE TOTALS WEEK 90 MONTH 102
10	11 SCHEDULED SORTIES: 26 14 Turn 12 (Day Sorties)	12 SORTIE SURGE ----- 14 Turn 12 14 Turn 12	13 (150 SCHEDULED 14 Turn 12 12 Turn 12	14 SORTIES)----- 12 Turn 12 12 Turn 12	15 SCHEDULED SORTIES: 12 DAY SORTIES	16 SORTIE TOTALS WEEK 188 MONTH 290
17	18 SCHEDULED SORTIES: 26----- 14 Turn 12-----	19 -----	20 -----	21 -----	22 SCHEDULED SORTIES: 12 DAY SORTIES	23 SORTIE TOTALS WEEK 116 MONTH 406
24/31	25 SCHEDULED SORTIES: 26----- 14 Turn 12-----	26 -----	27 -----	28 -----	29 UTE DOWN DAY or FLY (If Necessary)	30 SORTIE TOTALS WEEK 104 MONTH 510

AF Form 3153, SEP 85 GENERAL PURPOSE (11 x 8½)

☆ U.S. Government Printing Office: 1987—189-956/51651

SORTIES SCHEDULED (MONTH) : 568

SORTIES REMAINING (HALF) : 1906

MONTH: August, 1988

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 SCHEDULED SORTIES: 26 ---- (14 Turn 12) ----	2	3	4	5 SCHEDULED SORTIES: 12 DAY SORTIES	6 SORTIE TOTALS WEEK MONTH 116 116
7	8 SCHEDULED SORTIES: 26 14 Turn 12 (Day Sorties)	9 SORTIE SURGE ---- (52 SCHEDULED SORTIES) 14 Turn 12 14 Turn 12	10 14 Turn 12 14 Turn 12	11 SCHEDULED SORTIES: 26 14 Turn 12	12 SCHEDULED SORTIES: 12 DAY SORTIES	13 SORTIE TOTALS WEEK MONTH 168 284
14	15 SCHEDULED SORTIES: 26 ---- 14 Turn 12 ----	16	17	18	19 SCHEDULED SORTIES: 12 DAY SORTIES	20 SORTIE TOTALS WEEK MONTH 116 400
21	22 SCHEDULED SORTIES: 26 ---- 14 Turn 12 ----	23	24	25	26 SCHEDULED SORTIES: 12 DAY SORTIES	27 SORTIE TOTALS WEEK MONTH 116 516
28	29 SCHEDULED SORTIES: 26 ---- 14 Turn 12 ----	30	31 UTE DOWN DAY			SORTIE TOTALS WEEK MONTH 52 568

AF Form 3153, SEP 85 GENERAL PURPOSE (11 x 8½)

SORTIES SCHEDULED (MONTH) : 484
SORTIES REMAINING (HALF) : 1422

MONTH: September, 1988

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 SCHEDULED SORTIES: 26 14 Turn 12	2 SCHEDULED SORTIES: 12 DAY SORTIES	3 SORTIE TOTALS WEEK 38 MONTH 38
4	5 HOLIDAY NO FLY	6 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	7 ------	8 ------	9 SCHEDULED SORTIES: 12 DAY SORTIES	10 SORTIE TOTALS WEEK 90 MONTH 128
11	12 SCHEDULED SORTIES: 26 14 Turn 12 (Day Sorties)	13 SORTIE SURGE: ------	14 (150 SCHEDULED	15 SORTIES) ------	16 SCHEDULED SORTIES: 12 DAY SORTIES	17 SORTIE TOTALS WEEK 188 MONTH 316
18	19 SCHEDULED SORTIES: 26------ 14 Turn 12 ------	20 ------	21 ------	22 ------	23 SCHEDULED SORTIES: 12 DAY SORTIES	24 SORTIE TOTALS WEEK 116 MONTH 432
25	26 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	27 ------	28 NO FLY-- END	29 OF FISCAL YEAR OF FLYING HOURS	30 FLY-OUT UTE DOWN DAY	SORTIE TOTALS WEEK 52 MONTH 484

AF Form 3153, SEP 85

GENERAL PURPOSE *(11 x 8½)*

SORTIES SCHEDULED (MONTH) : 510

SORTIES REMAINING (HALF) : 912

MONTH: October, 1988

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3 SCHEDULED SORTIES: 26 14 Turn 12 (Day Sorties)	4 SORTIE SURGE: ------	5 (150 SCHEDULED SORTIES) ------	6 ------	7 SCHEDULED SORTIES: 12 DAY SORTIES	8 SORTIE TOTALS WEEK 188 MONTH 188
9	10 HOLIDAY NO FLY	11 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	12 ------	13 ------	14 SCHEDULED SORTIES: 12 DAY SORTIES	15 SORTIE TOTALS WEEK 90 MONTH 278
16	17 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	18 ------	19 ------	20 ------	21 SCHEDULED SORTIES: 12 DAY SORTIES	22 SORTIE TOTALS WEEK 116 MONTH 394
23/30	24/31 26 Sorties UTE DOWN DAY	25 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	26 ------	27 ------	28 SCHEDULED SORTIES: 12 DAY SORTIES	SORTIE TOTALS WEEK 116 MONTH 519

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☆ U.S. Government Printing Office: 1987—180-966/81651

SORTIES SCHEDULED (MONTH) : 538

SORTIES REMAINING (HALF) : 374

MONTH: November, 1988 -

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	2	3	4 SCHEDULED SORTIES: 12 DAY SORTIES	5 SORTIE TOTALS WEEK 90 MONTH 90
6	7 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	8	9	10	11 HOLIDAY NO FLY	12 SORTIE TOTALS WEEK 104 MONTH 194
13	14 SCHEDULED SORTIES: 26 14 Turn 12 (Day Sorties)	15 SORTIE SURGE ------	16 (150 SCHEDULED SORTIES)	17	18 SCHEDULED SORTIES: 12 DAY SORTIES	19 SORTIE TOTALS WEEK 188 MONTH 382
20	21 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	22	23	24 THANKSGIVING	25 NO FLY (UTE DOWN DAY)	26 SORTIE TOTALS WEEK 78 MONTH 460
27	28 SCHEDULED SORTIES: 26 ------ 14 Turn 12 ------	29	30			SORTIE .OTALS WEEK 78 MONTH 538

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U.S. Government Printing Office: 1987—180-966/91661

SORTIES SCHEDULED (MONTH) : 374
SORTIES REMAINING (HALF) : 374

MONTH: December, 1988

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 SCHEDULED SORTIES: 26 14 Turn 12	2 SCHEDULED SORTIES: 12 DAY SORTIES	3 SORTIE TOTALS WEEK 38 MONTH 38
4	5 SCHEDULED SORTIES: 26 --- 14 Turn 12 ---	6	7	8	9 SCHEDULED SORTIES: 12 DAY SORTIES	10 SORTIE TOTALS WEEK 116 MONTH 154
11	12 SCHEDULED SORTIES: 26 --- 14 Turn 12 ---	13	14	15	16 SCHEDULED SORTIES: 12 DAY SORTIES	17 SORTIE TOTALS WEEK 116 MONTH 270
18	19 SCHEDULED SORTIES: 14 --- Single Flying Period per Day ---	20	21	22	23 NO FLY	24 SORTIE TOTALS WEEK 56 MONTH 326
25	26 SCHEDULED SORTIES: 12 --- Single Flying Period per Day ---	27	28	29	30 UTE DOWN DAY	31 SORTIE TOTALS WEEK 48 MONTH 374

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